Operations and Maintenance Manual

ASC-903 High-Voltage Signal Conditioner

Astro-Med, Inc.

ASC-903
OPERATIONS
and
SERVICE
MANUAL

ASTRO-MED
Part Number
22834-903

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Printed in the United States of America
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About This Manual

This manual contains all of the information necessary to setup, operate, and maintain your ASC-903 (High Voltage) signal conditioner.

The manual is divided into the following chapters and appendices:

- **Chapter 1**, "Safety Precautions", lists precautions and warnings that should be considered when operating the ASC-903

- **Chapter 2**, "Operation," explains the operation of the ASC-903 signal conditioner and high-voltage isolation module.

- **Chapter 3**, "Calibration," lists the steps necessary to calibrate your signal conditioner.

- **Appendix A**, "Card Cage Setup and Signal Conditioner Installation," provides a full description of the signal conditioner card cage and lists the steps necessary for mounting the card cage in a rack or free-standing cabinet, procedure for installing the signal conditioners into the card cage, pin tables detailing the wiring connections for operation and detailed procedure for attaching the card cage to your recorder.

- **Appendix B**, "Replaceable Parts," lists parts and part numbers for each signal conditioner.

- **Appendix C**, "Drawings," includes various schematics and assembly drawings for your signal conditioner.

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Chapter 1 - SAFETY PRECAUTIONS

Before attempting to setup, install or operate your ASC-903 High Voltage Amplifier, the safety precautions that appear in this section and throughout the text must be understood. Please take the time to read the Operations Manual thoroughly and fully understand the operation of the equipment, and the symbols and warnings presented.

These symbols and warnings must be observed during all phases of service, repair and operation of this instrument.

Failure to comply with these precautions throughout the manual violate safety standards of design, manufacture and intended use of the instrument.

Astro-Med, Inc., assumes no liability for the customers failure to comply with these safety requirements.

The symbols and warnings that you will encounter in this manual are presented and defined below. They are provided at this time to emphasize their importance.
The symbols that you will encounter within this text are:

This symbol indicates hazardous voltage.

This symbol indicates earth (ground) terminal.

Warnings regarding the safe operation of the ASC-903

As you use this manual you will encounter **WARNINGS** that precede potentially hazardous operations. Please observe the following warnings at all times when in contact with the ASC-903

WARNING

Under normal operation, lethal voltages may be present inside the High-Voltage Isolator Module and it's input wiring. DO NOT attempt any repair or maintenance.

DO NOT attempt to measure any voltage in excess of 2000 volts off ground

DO NOT operate the instrument in the presence of flammable gases or fumes

DO NOT SUBSTITUTE PARTS OR MODIFY THE INSTRUMENT IN ANY WAY.

Because of the danger of introducing additional hazards, do not install or substitute parts, or perform any unauthorized modification to the instrument. Return to an Astro-Med Sales and Service office for service and repair to ensure proper safety and maintenance.

Instruments which appear damaged or defective should be deactivated and guarded against unintended operation until they can be repaired by qualified service personnel.

System Contents

The ASC-903 System is shipped with the accessories listed below. Before you begin installation , check to see that all the items listed have been included. If any parts are missing, call our customer service department at (401) 828-4000.

- One ASC-903 Plug-In Signal Conditioner (P/N-41511-103) with PC Board (P/N-31891-001)
- One Isolation Module (P/N-31911-000) with High Voltage PC Board (P/N-31893-001)
- One 20' double strand High-Volt cable—Red (P/N-12762-011), Black (P/N-12762-012) to attach the Isolation Module to the High-Voltage source

The following items are dependent upon the recorder and card cage being used with the signal conditioner. You will only receive one of the following items.

MT-Series Recorder to the C-950/C-950R Card Cage

- One 5' M/M 15-pin D-shell cable (P/N-22240-115) to attach the Isolation Module to the signal conditioner card cage.

MT-Series Recorder to the C-150/C-150R Card Cage

- One 10' M/M 15-pin D-shell cable (P/N-22240-120) to attach the Isolation Module to the signal conditioner card cage.

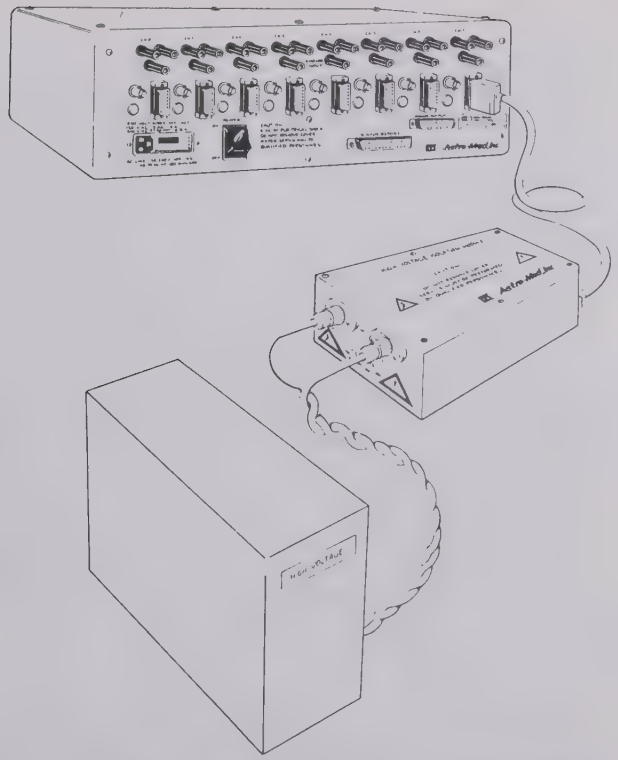
DASH II Series Recorder (Built-in Card Cage)

- One 5' M/M 15-pin D-shell cable (P/N-22353-021) to attach the Isolation Module to the recorder.

Chapter 2

Description of the ASC-903 System
Unlike the other signal conditioners of the ASC-900 Series, the ASC-903 consists of two major components: the plug-in signal conditioner and a stand-alone high-voltage isolation module.

Plug-in Signal Conditioner
The ASC-903 plug-in signal conditioner is physically and functionally similar to the other ASC-900 Series signal conditioners except for it's capacity to handle extremely high voltages. An isolated front end, designed to record high-voltage signals, provides a means for scaling voltages to a level compatible with standard Astro-Med instruments. The ASC-903 is installed in the signal conditioner card cage in the same manner as all of the other signal conditioners.



Typical ASC-903 Configuration

The Isolation Module

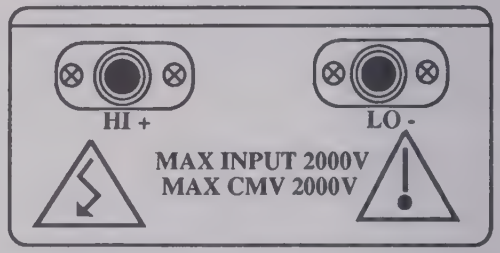
The stand-alone high-voltage isolation module contains all the high voltage input components. The isolation module optically isolates the inputs from the output. Spark gaps and fuses are included in the isolation box to protect against over voltage.

A 15-pin multiconductor signal interface harness connects the signal conditioner card cage to the stand-alone, high-voltage isolation module to carry safe, low level analog and control signals to the card cage. Depending upon the recorder being used, a special 15-pin multiconductor interface is provided.

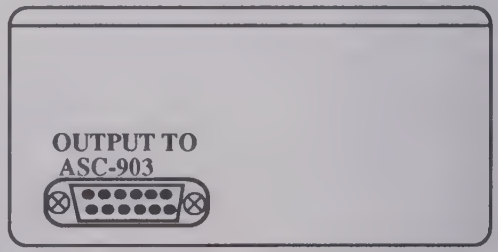
The user is also furnished with 20 feet of red and black cable to connect the Isolation module to the input source. It is important that these leads be twisted before use to minimize unwanted noise.

NOTE: If excessive noise persists, the connnectors to the isolator module should be carefully inspected. Bad connections may result in increased noise pickup which is usually worsened by movement of the cable.

A. **Isolation Module**: Left Side with **HI +** (red) and **LO -** (black) high-voltage input receptacle.



B. **Isolation Module**: Right Side with 15-pin D-shell.



ASC-903 System Connections

1. Attach the high-voltage isolation module to the signal conditioner card cage using the appropriate 15-pin D-shell connector (part number dependent upon recorder and card cage being used, see: System Contents for Astro-Med part number).

NOTE: Included with your ASC-903 signal conditioner are #4-40 pan head Phillips-head screws and #4 split washers. These may be required if the 15-pin male signal cable does not mount snugly to the 15-pin female connector on the back of the C950 card cage.

•If the 15-pin male signal cable does not mount snugly to the C950 card cage: Open the top of the card cage and replace the block mounting hardware . The new hardware will permit the tie-down screws on the gray cable to firmly hold the connector in place.

2. Attach the 20' high-voltage harness, Red (P/N-12762-011) and Black (P/N-12762-012) to the isolation module.

3. Twist the red and black wire harness completely.

NOTE: It is important that the leads on the red and black wires be twisted before use to minimize unwanted noise.

4. Attach the loose end to the high-voltage source.

5. Connect the conditioned signals from the signal conditioner card cage to the recorder in one of the following ways:

• Attach the male end of the 25-pin D-shell M/F cable (Astro-Med furnished P/N-22240-010) to the signal conditioner card cage and the female end to the recorder. Since each signal travels through its own strand of ribbon cable, up to eight signals may be transferred through this one cable.

• Connect a **customer furnished** shielded BNC cable to the appropriate BNC jacks on the rear panel of the signal conditioner card cage and the recorder.

6. Attach the male end of the 37-pin D-shell M/F connector (Astro-Med furnished if the "Talking Signal Conditioner" feature is desired)

7. Attach one of the two power cords furnished with the signal conditioner card cage. If an MT-8800 or MT-9500 recorder is being used either of the power cords can be used. The recorder to signal conditioner power cord (P/N-22567-000) provides power to the card cage via the recorder power switch, when the card cage switch is left on. If an MT-8800 or MT-9500 is not being used or separate power is desired, a separate hospital grade power cord (P/N-21464-001) is also provided.

8. Turn the power ON.

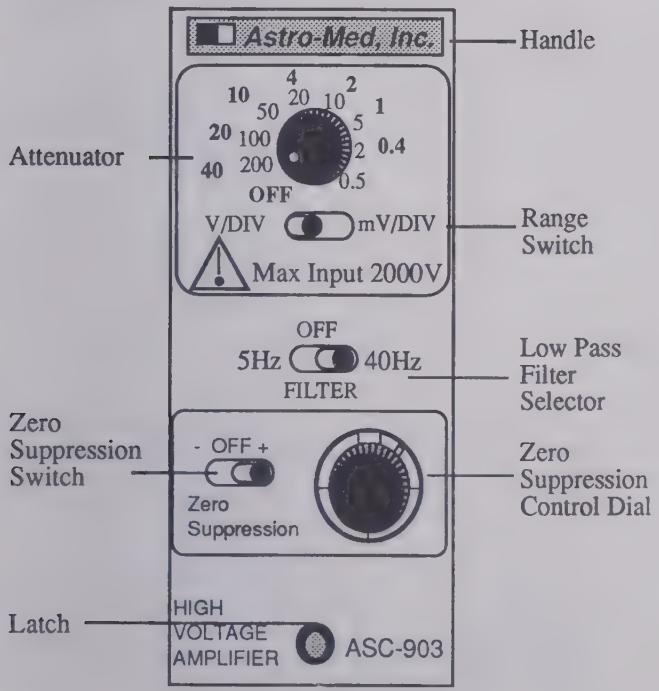
NOTE: The MT-9500 recorder must be calibrated to 10 millivolts per division which is the normal factory calibration when the recorder front panel gain switches are in the "CAL" positions.

IMPORTANT NOTE

Both the **ASC-903 Signal Conditioner** and the **Isolation Module** are calibrated at the factory to function most effectively as a matched pair.

To ensure optimum performance of the units, they should always be used together.

Please check that the serial numbers on the two units match prior to use. The serial numbers are located on foil labels on the sides of both units.



ASC-903 Signal Conditioner

The ASC-903 (High Voltage) signal conditioner uses attenuation and zero suppression to accept a range of input signals from 0.5mV(1 div) to 2000 V (full scale) *maximum. This section discusses the operation and functions required to attenuate a signal.

* Assumes a 50 division grid.

Description of Controls

Attenuator

The attenuation controls, in the upper portion of the signal conditioner, enable you to determine the number of mV or V per division on the chart paper. The selection consists of two controls: a range switch and an attenuator switch.

The range switch sets the scale of the incoming signal to the signal conditioner. The switch contains two settings: **V/DIV** (red) and **MV/DIV** (black).

The attenuator switch determines the signal sensitivity (number of mV or V per chart division). For the **ASC-903**, the V scale (red) has seven sensitivity settings and the mV scale (black) have ten sensitivity settings. Listed below are the input range settings for the ASC-903.

The red **V/DIV** settings include: **0.4, 1, 2, 4, 10, 20, 40** and the black **MV/DIV** settings include: **0.5, 1, 2, 5, 10, 20, 50, 100, 200** and **OFF.**

NOTE: If you do not know the amplitude of the incoming waveform, position these controls on their least sensitive setting and rotate the attenuator switch toward the most sensitive settings to bring the signal "on scale" of the chart.

Zero Suppression

Very often, signals input into the signal conditioner are composed of AC and DC components. Typically zero suppression is used to eliminate (suppress) a dominant and unwanted direct current (DC) component of the input signal. This allows you to move the output wave anywhere on the chart and expand the portion of the AC signal that is of interest to you. It is important to note that zero suppression occurs before the gain amplification stage.

The **Zero Suppression Controls** of your signal conditioner consist of a **Zero Suppression Switch** and a **Zero Suppression Control Dial.**

The **Zero Suppression Switch** subtracts the DC level. Setting the switch in the positive (+) position shifts the output wave to the left side of the chart and setting the switch in the negative (-) position shifts the wave output to the right side of the chart. Shifting this switch **OFF** shuts down the entire zero suppression mechanism.

The potentiometer determines how far the zero moves, thus determining the new baseline value.

To shift the zero point:

1. Set the zero suppression switch to + or - to determine the direction of the signal.
2. Set the potentiometer to the number of mV or V that you wish to shift the baseline.

3-Position Filter Switch (5Hz-OFF-40Hz)
The 3-Position Filter Switch can be used to eliminate high frequency components.

"Talking Signal Conditioner" Feature
The ASC-900 Series signal conditioners are capable of "talking" to the recorders via the Astro-Med furnished 37-pin D-shell M/F cable. "Talking" refers to the capability of the signal conditioners to send selected conditioner status data to the recorder to be printed in any of the interchannel annotation buffers.

Your recorder must be equipped with the channel annotation feature to utilize the "Talking Signal Conditioner" feature. Channel annotation is a standard feature on the MT-8800 and the DASH II model MT recorders. This feature must be ordered as **an option** for the MT-9500 recorder.

The channel annotation feature provides the recorder with the capacity to print a maximum of 100 alphanumeric characters in each of the interchannel annotation buffers. The "Talking Signal Conditioner" feature uses the last 40 character spaces of each buffer to print signal conditioner status data such as switch positions, filter on-off, etc.

See the discussions of the "Annotation or Event Set-Up" and the "Annotation Entry Set-Up" in your recorder Operations Manual for further details.

ASC-903 Specifications

Range..... 0.5 mV/div to 2000V, full-scale, calibrated

Maximum Input..... 2000VDC or peak-to-peak AC

Attenuator..... 15 Steps: 0.5, 1, 2, 5, 10, 20, 50, 100, 200 mV/div; 0.4, 1, 2, 4, 10, 20, 40V/div and OFF position.

Common Mode Rejection ..... 110dB @ DC

Isolation Mode Voltage ..... Input should never be greater than 2000V above ground

Input Impedance..... 200 megohms, differential (VRange)
1 megohm, differential (mV Range)

Frequency Response ..... <3dB down @ 1kHz

Non-Linearity..... ± 0.1% of full-scale

Low-Pass Filter..... 5Hz-OFF-40Hz, front-panel switch

Zero Suppression..... ± 10V and ± 2000V, switch selectable and continuously between ranges

Calibration ..... Factory Set

In Case Of Difficulty

This section is provided to assist you in diagnosing and correcting simple problems with your signal conditioner. Call our Customer Service Department at (401) 828-4000 if problems persist.

DIFFICULTY	PROBABLE CAUSE	SOLUTION
The signal is clipped or pegged full-scale.	The incoming signal is too large for the sensitivity setting.	Decrease the sensitivity with the attenuator switch or the trange switch.
	The zero suppression switch is (+) or (-).	Turn the zero suppression OFF.
	The signal conditioner is not seated properly, or is missing.	Reinstall the signal conditioner Unused channels should not be connected to the recorder.
The signal amplitude is smaller than it should be.	The incoming signal is too small for the sensitivity setting.	Increase the sensitivity with the attenuator switch or the range switch.
Noisy baseline	No power to the card cage	Check the power switch and AC power cord on the rear of the card cage.
	Signal input floating	Check the input wiring. Unused channels should be OFF.

Calibration Procedure for ASC-903

Equipment Needed:

- General purpose oscilloscope or recorder
- Digital multimeter (3 1/2 digit or above)
- DC source with greater than 1% accuracy
- Extension Card - Astro-Med Part No. 30776001- for recalibration within the system
- Complete package of ASC-903 signal conditioner
    a) Isolation Module
    b) ASC-903 pre-amp
    c) 15-pin Male to Female D-shell
    d) High Voltage Signal Input cable (red and black)

Set-up Procedure

- Remove the right side cover of the signal conditioner
- Connect the extension card to the signal conditioner PCB and reinsert into the card cage
- Turn the Low Pass Filter and Zero Suppression Switch to OFF
- Place the negative meter lead to Common input (Black binding post on back of card cage)
- Please refer to Schematic No.31891-001 for location of the variable resistors
- Short the Signal Input Cable on the Isolation Module

NOTE: The Signal Input Cable should remain shorted throughout the Calibration Procedure.

Null Calibration - Short the inputs together by placing a jumper between the positive and negative (red and gray) binding posts on the back of the card cage.

	Attenuator/Range	+ Meter Lead Location	Adjust to 0V±2mV
Output Offset	Check through all ranges	TP6	R14 for null on the atten. position where the meter reading was highest.
Input Offset	Off	TP8	R18
Input Offset Check	0.5mV/Div	pin 2 of edge connector or signal out BNC on back of recorder.	R18
Final Null	Off	Same as above	R11
Scale Adjustment	Fully Clockwise	Same as above	R21

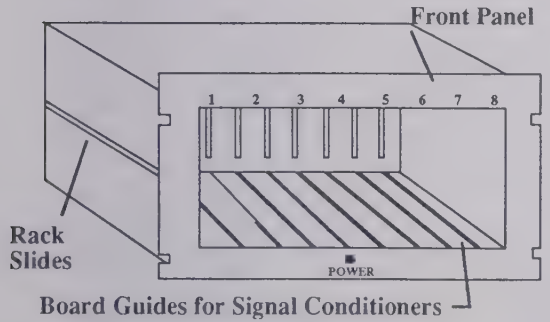
Gain Calibration - Remove the jumper from the binding posts and apply the signal to the appropriate binding posts.

	Attenuator/Range	Input Voltage	Adjust to 0.5VDC± 1% (+ meter lead on Pin 2 of edge connector or signal out BNC)
Gain Calibration	50mV/Div	2.5VDC	R9
	10mV/Div	500mVDC	R4
	2mV/Div	100mVDC	R3

Zero Suppression - Remove the input signal

	Attenuator/ Range	+Meter Lead Location	Zero Suppr. Knob	Adjust
Ref. Adj.	Off	TP9	-----	R41 for +5VDC± 50mV
+ Zero Suppress.	10mV/Div	pin 2 of edge connector or BNC conn. (sig.out)	5.00	Zero Suppr. Sw. to +, Check for +5VDC ±50mV
- Zero Suppress.	10mV/Div	Same as above	5.00	Zero Suppr. Sw. to -, Check for +5VDC ±50mV

C-950 Card Cage Set-up and Signal Conditioner Installation



C-950R Card Cage

NOTE: The signal conditioner card cage C-950R is designed to be slide mounted in a 19" wide rack cabinet. It is also available in a portable enclosure as model C-950.

Your signal conditioner card cage is shipped with the accessories listed below. Before you begin installation, check to see that all the items listed have been included. If any parts are missing, call our customer service department at (401) 828-4000.

- Eight 15-pin D-shell connectors (P/N-10909-115)
- Eight D-shell cable clamp assemblies with spring latches (P/N-10909-815)
- One 25-pin D-shell M/F cable (P/N-22240-010)
- One 37-pin D-shell M/F cable (P/N-22240-037)
- Four D-shell retaining clips for 25 and 37 pin connectors (P/N-10909-776)
- One hospital grade power cord (P/N-21464-001)
- One recorder-to-signal conditioner card cage power cord— for use with the MT-9500 and MT-8800 recorder only (P/N-22567-000)
- Rack Mounting Hardware
- Blank Panels (when required) (P/N-30881-100)

NOTE: It is the customer's responsibility to furnish banana jack inputs and/or BNC cables if required.

Red dust covers for 15-pin inputs (P/N-10909-981) are available.

Mounting the Card Cage

The signal conditioner card cage can be mounted in either of two ways. It can be mounted in a rack, or in it's own portable closure. Both methods are described below.

Rack Mounting

1. Attach the universally adjustable rack-mounting slide brackets to your rack. See your recorder operations manual for the installation procedure.

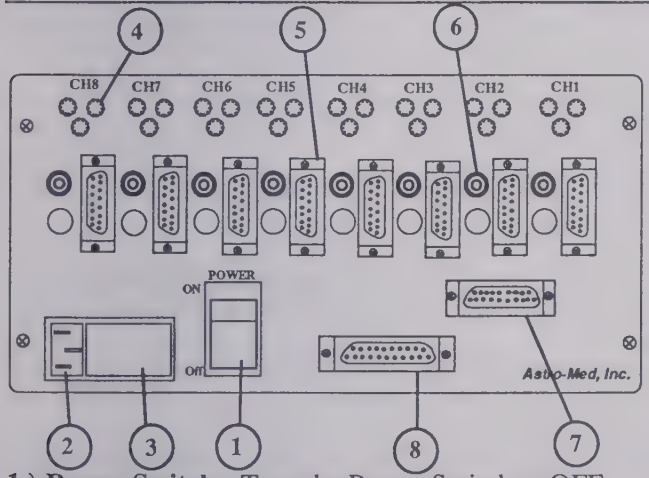
2. Place the four U-clip / nuts (P/N-12348-002) on the mounting rails of the rack so each U-clip / nut is aligned with a screw hole.

3. Slide the card cage completely into the rack and align the mounting slots with the screw holes.

4. Secure the card cage by tightening the four #10 Phillips-head mounting screws (P/N-12348-001).

Cabinet Mounting

1. To install the card cage in the free-standing cabinet, refer to steps 2-4 of the rack mounting procedure, above. Step 1 has already been done for you.



1.) Power Switch - Turn the Power Switch to OFF before plugging in the power and signal cables.

2.) Power Cord Options

Hospital Grade Power Cord (P/N-21464001)-Allows direct connection of card cage to AC Power Source.

Recorder to Card Cage Cord (P/N-22567000)-Allows the connection of the card cage to the recorder and use of the recorders power switch.

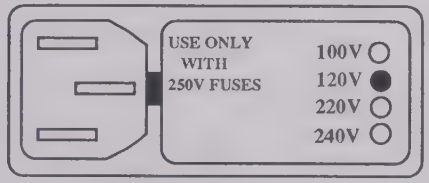
3.) Power Entry Module

The AC input line is programmable by adjusting the following parameters within the power entry module:

A. Fuse size and amperage rating
B. Fuse block arrangement
C. Voltage selection card orientation

3A.) Fuse Size and amperage rating - Using the North American Fusing Arrangement (120VAC), use one 1/4" x 1 1/4", 3AG 1.5A (P/N-10363-150).

Using the European Fusing Arrangement (240V AC), use two 5mm x 20mm, 0.8A (P/N-10365-080).



Power Entry Module

3B.) Fuse Block Arrangement

1. Turn the power OFF and disconnect the power cord.

2. Open the cover of the power entry module using a small blade screwdriver and remove the cover.

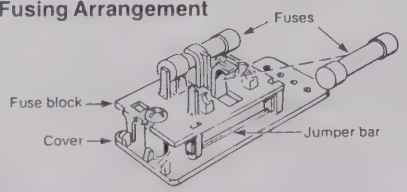
3. Loosen the Phillips-head mounting screw that attaches the fuse block to the cover of the module.

4. Slide the fuse block upward and pull it away to release it from the Phillips-head mounting screw and pedestal.

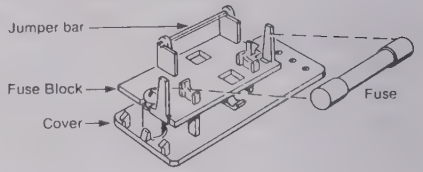
5. Change the fuse(s).

6. Slide the fuse blocks back onto the Phillips-head mounting screw and pedestal (fuses that go into the fusehousing first are the active fuses) and tighten the screw.

European Fusing Arrangement



North American Fusing Arrangement



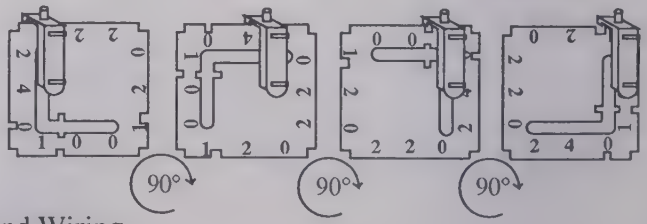
3C.) Voltage Selection

1. Turn the power OFF and disconnect the power cord.

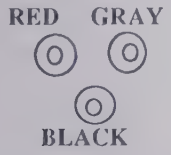
2. Open the cover of the power entry module using a small blade screwdriver and remove the cover.

3. Carefully remove the voltage selector card from the power entry module.

4. Adjust the card so the desired voltage is readable at the bottom and the plastic pointer is pointing up. When the pointer is set, successive voltage settings are selected by rotating the card 180° clockwise.



4.) 5-Way Binding Posts - (Signal Inputs) The binding posts are alternate signal inputs, in parallel with the 15-pin D-Shell Connectors.

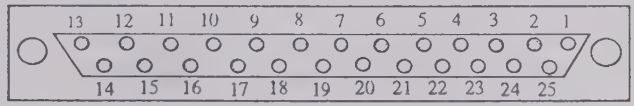


Black - Signal +
Gray - Signal -
Black - Common

5.) 15-pin D-Shells - (Signal Inputs) -These inputs are used to transfer signals from the source to the signal conditioner. Please refer to your specific signal conditioner manual for pin connections as they will vary depending on the application.

6.) BNC Jacks - (Signal Outputs) - Allows individual channel outputs to be fed to the recorder. The signal output of these jacks is 10mV/Div.

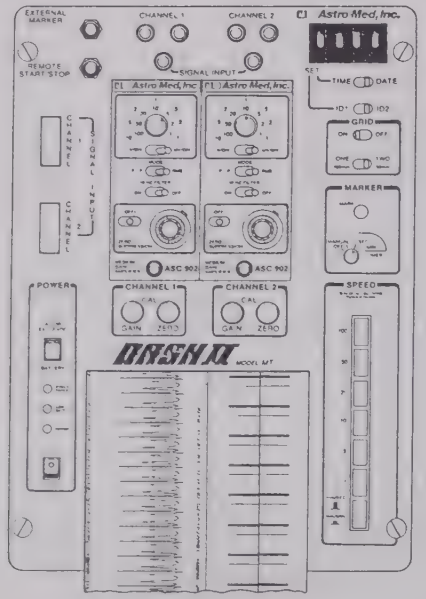
7.) 25-Pin D-Shell - (Signal Output) -Provides means to output conditioned signals to the recorder when all eight signal conditioners are used. Signal output is 10mV/Div.



Description	Pin#	Description	Pin #
Channel 1+	2	Channel 5+	10
Common	3	Common	11
Channel 2+	4	Channel 6+	12
Common	5	Common	13
Channel 3+	6	Channel 7+	14
Common	7	Common	15
Channel 4+	8	Channel 8+	16
Common	9	Common	17

8.) 37 Pin D-Shell Connector - ("Talking Signal Conditioner" Connection) - This 37 pin D-Shell connector allows the signal conditioner to transmit status information directly to the recorder be way of the inter-channel annotation buffers.

Your Dash II Series recorder is shipped with two signal conditioners. All recorder/signal conditioner wiring has been completed internally. Only the signal input wiring will need to be completed.

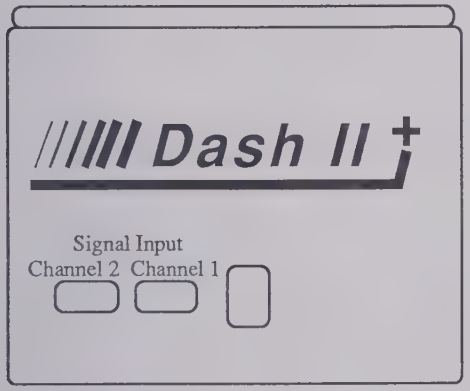


Dash II MT

Signals are input to the recorder by either the 15 Pin D-Shell connector or the 5 Way Binding Posts.

The 15 pin D-Shell connectors are located to the left of the signal conditioners and marked Channel 1 and Channel 2. The wiring of the 15 pin D-Shell will vary depending on the signal conditioner used. Please refer to the appropriate section in the signal conditioner manual. (Pin Connections are identical for both the DashII series and the Card Cage.)

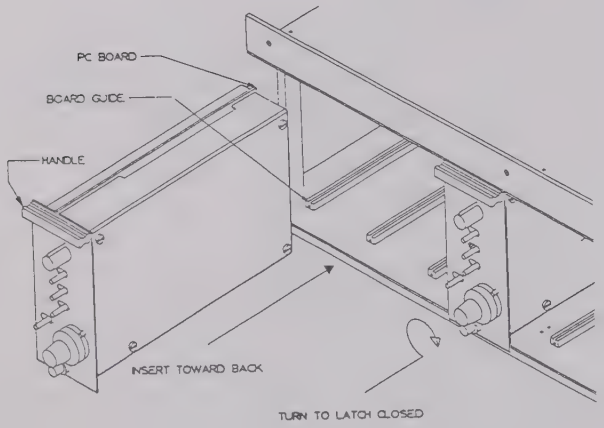
Two 5-Way Binding Posts are located above the signal conditioners. They are an alternate means of signal input, in parallel with the 15 Pin D-Shell Connectors.



With the Dash II+ all signal inputs are wired through the 15 Pin D-Shell Connectors which are located on the top, lower left hand corner of the unit.

Note: A jumper is required, on the Dash II+ only, between pins 3 and 7 of the 15 pin D-Shell unless the TC200 is being used.

A total of eight ASC-900 Series signal conditioners (any mix) can be plugged into the card cage. (Two Signal Conditioners come with the Dash II Series recorders.) Each signal conditioner is complete with all the panel controls required to perform a particular function. The operation of your specific signal conditioner is outlined in this manual.



To install the signal conditioner:

1. Turn the latch located on the bottom of the signal conditioner counterclockwise until it is fully loosened.

2. Align the signal conditioner PC board with the board guides in the signal conditioner card cage/enclosure.

3. Carefully slide the signal conditioner into the card cage until it clicks into place.

Do not force the signal conditioner into place. If the signal conditioner doesn't slide into place easily, remove it from the card cage and realign it within the board guides.

4. Turn the latch completely clockwise to lock the signal conditioner into place.

CAUTION: Never insert or remove the signal conditioner by pushing or pulling on its potentiometer as it may break. Use the handle of the signal conditioner to slide the conditioner in and out of the card cage.

ASC-903 Assembly Parts List

Schematic #	Part#	Description
1	31891001	ASC-903 Signal Conditioner Assembly
2	41503012	ASC-903 Front Panel Bracket
3	31909003	ASC-903 Front Panel Overlay
4	31908041	Right Side Cover
5	31908031	Left Side Cover
6	10399005	Spacer
7	10489007	Spacer, Thrd, 1/4 Hex
8	11406004	Knob with Index Line
9	11406007	Peaked Cap with dot
10	11548008	Screw, #4, Bind Head, 1/4
11	21608002	Potentiometer and Connector Assembly, 5 Turn, 10K
12	11297000	10 Turn Dial
13	12060003	Latch
15	22612030	Signal Conditioner Handle with Screen
16	10654008	Screw, #4 Flat Head, 1/4

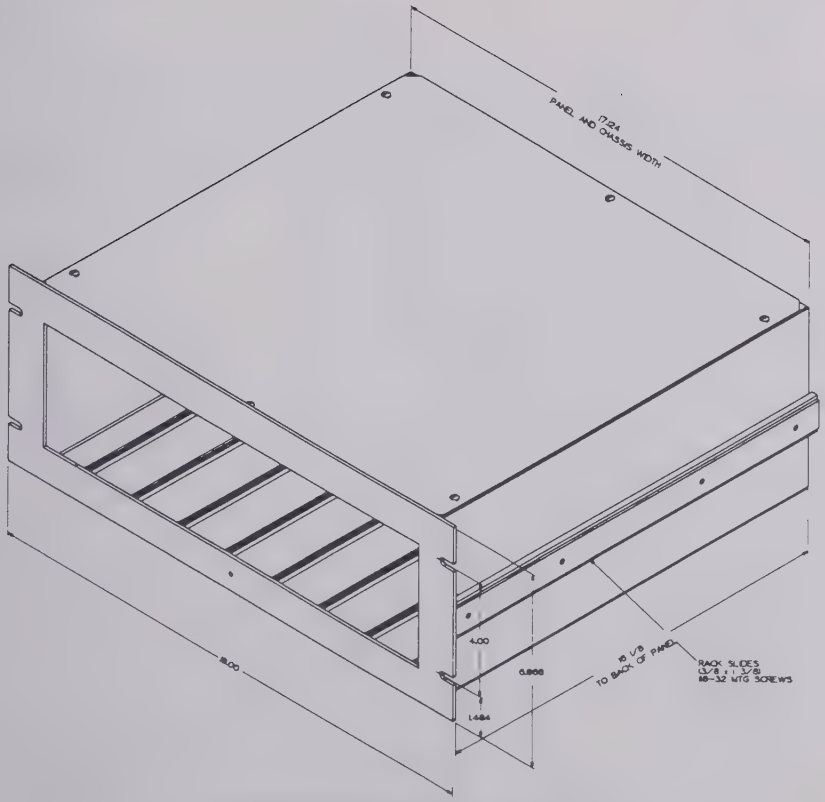
Component	Value	Part Number	Description
R2	4.7K	11617472	Thin Film Resistor 1/4 Watt, 1%
R3	5K	10973502	Trim Potentiometer, 0.5 Watt, ±10%
R4	10K	10973103	" "
R6	10K	11617103	Thin Film Resistor, 1/4 Watt, 1%
R7	4.7K	11617472	" "
R9	5K	10973502	Trim Potentiometer, 0.5Watt, ±10%
R10	8.2K	11617822	Thin Film Resistor, 1/4 Watt,1%
R11	20K	10973203	Trim Potentiometer, 0.5 Watt, ±10%
R12	4.7K	11617472	Thin Film Resistor, 1/4 Watt, 1%
R13	10K	11617103	" "
R14	10K	10973103	Trim Potentiometer, 0.5 Watt,±10%
R15	330K	10527334	Composition Resistor, 1/4 Watt, 5%
R16	4.7K	11617472	Thin Film Resistor, 1/4 Watt, 1%
R17	2K	10459302	Precision Resistor, 1/4 Watt, 1%
R18,21	20K	10973203	Trim Potentiometer, 0.5 Watt, ±10%
R36,37,39	10K	11617103	Thin Film Resistor, 1/4 Watt, 5%
R38, 40	4.7K	11617472	" "
R41	10K	10973103	Trim Potentiometer, 0.5 Watt, ±10%
R42,43,44	4.7K	11617472	Thin Film Resistor, 0.5 Watt, ±10%
R45	5.6K	11617562	" "
R46	20K	10459303	Precision Resistor, 1/4 Watt, 1%
R47	3.3K	11617332	Thin Film Resistor, 0.5Watt, ±10%
R48	5.6K	11617562	" "
R49	15K	11617153	" "

Component	Value	Part Number	Description
R50-55	10K	11617103	" "
SR1	4.7Kx9	12268472	Resistor Network
C1	6.8mF	11411685	Aluminum Electrolytic Cap. 35VDC
C2, 5, 7	0.1µF	10565104	Monolithic Ceramic Cap.100V, ±10%
C3	0.01µF	10565103	" ,50V, ±10%
C4, 6	6.8mF	11411685	Aluminum Electrolytic Cap. 35VDC
C15,20-23	0.01µF	10565103	" , 50V, ±10%
C24-29	0.15µF	10565154	" "
C30,32,33	0.1µF	10565104	" , 100V, ±10%
C31	1µF	10565105	" , 50V, ±20%
C34	0.47µF	10565474	" , 50V, ±10%
C35,36	0.15µF	10565154	" "
C37, 40	2.8µF	12170001	Solid Tantalum Capacitor, 15V, ±10%
C38	5µF	12170002	" "
C39,42	1µF	10565105	Monolithic Ceramic Cap., 50V, ±20%
C41	5µF	12170002	" "
U1,4	OP27	21604005	IC
U2	3140	10991030	IC
U3	AD524	21080100	IC
U6	OP14	21604003	IC
U7	REF-02	12121000	IC
U8	74148	21079148	IC
U9,10	74244	21079244	IC
U11,12	OP14	21604003	IC
S3,S7		20829016	
S4		20829041	
S6		21729004	
TP1-9		12325000	Testpoint

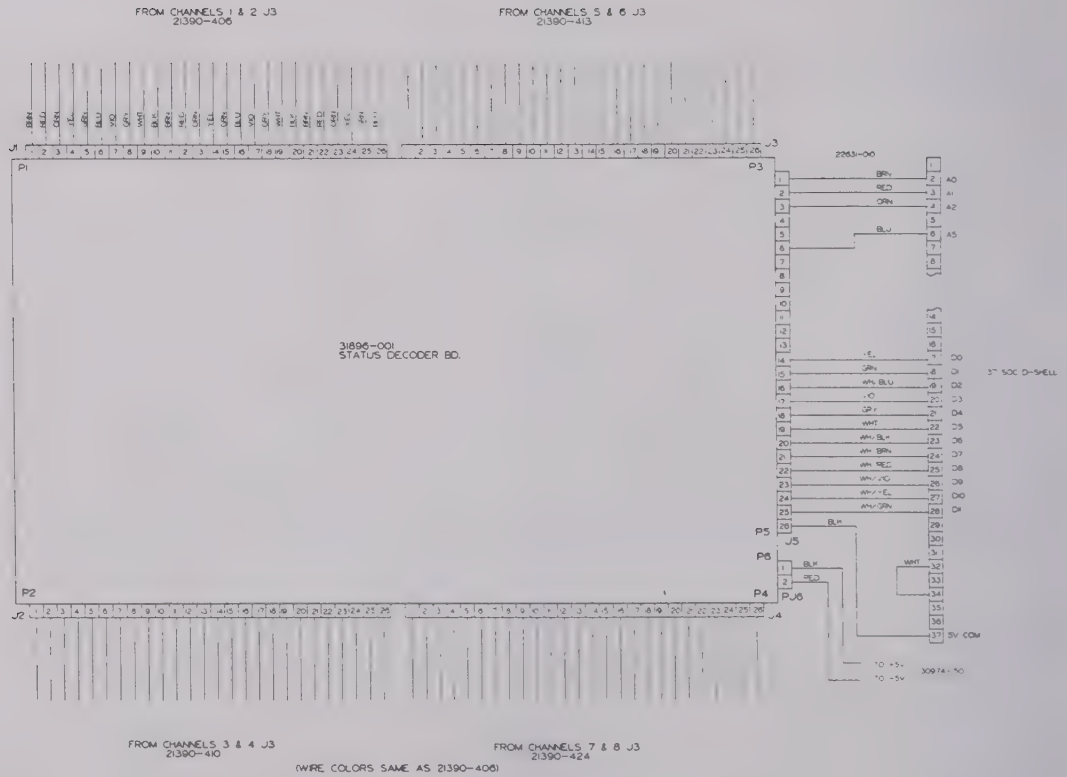
Appendix C Drawings

Description	Part Number
Card Cage Outline	31388-000
Card Cage Schematic	31229-110 (2 Pages)
Exploded View	
ASC-903	41511-003
PC Boards	
Pre Amp	31891-001
PC Board Schematic	31891-001

NOTE: The ASC-903 System P/N is 41511-003, which includes the isolation module, pre-amp plug in and harness.

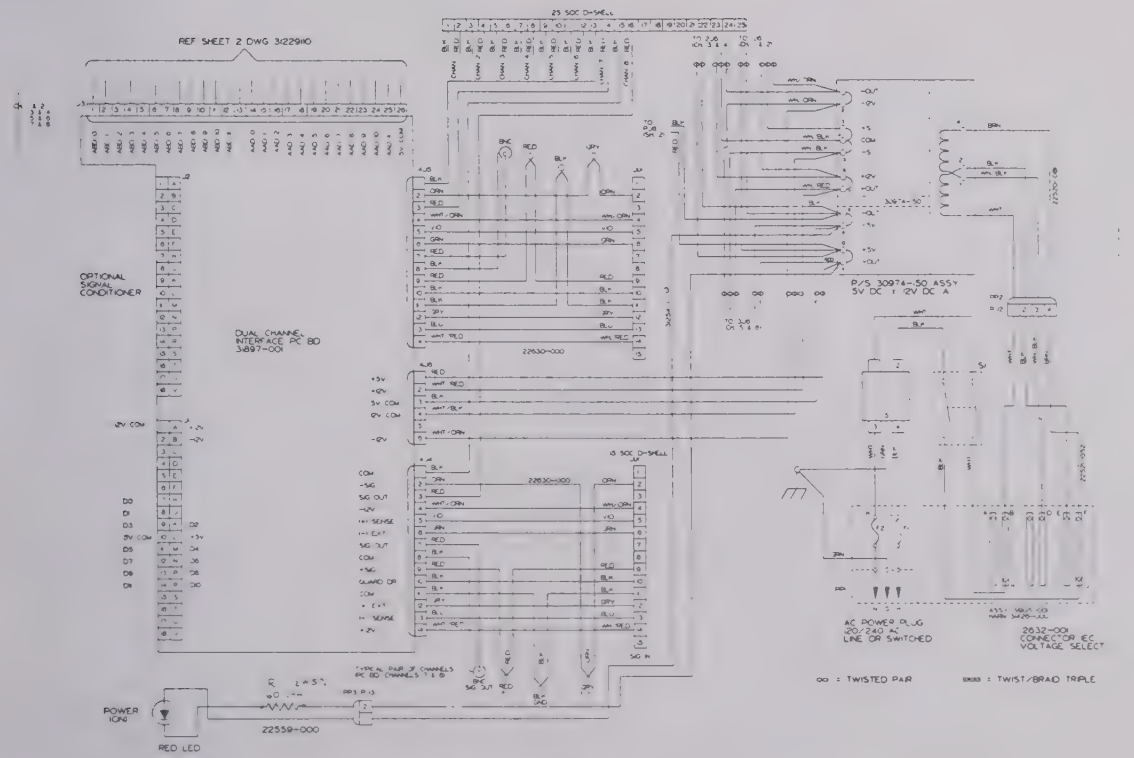


C-950/950R Card Cage Outline
31388-000



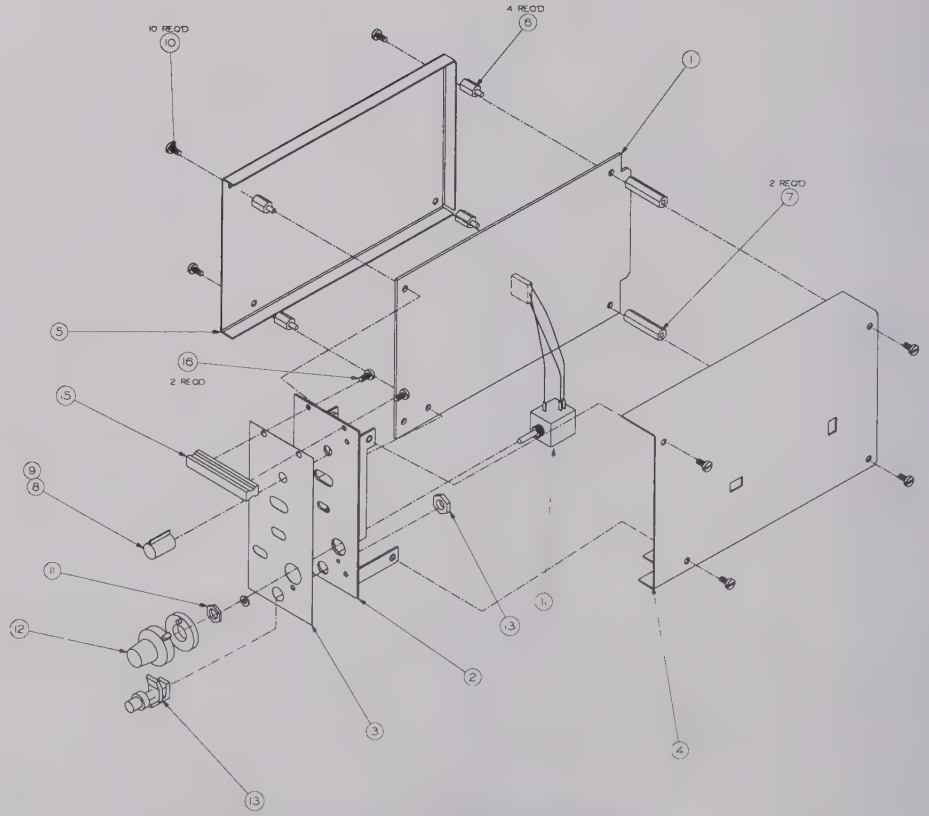
C-950/950R Card Cage Schematic

31229-110

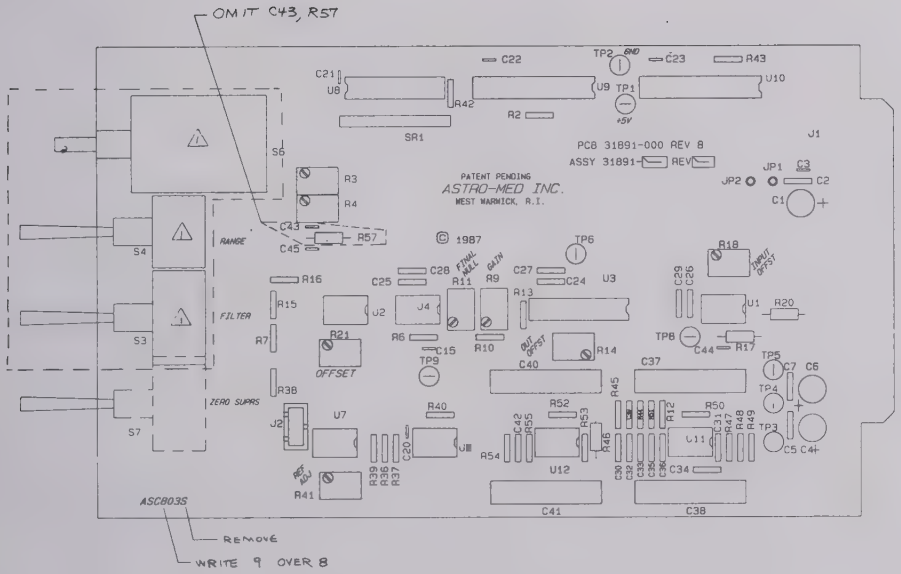

REF SHEET 2 DWG 31229H0
25 SOC D-SHELL
OPTIONAL SIGNAL CONDITIONER
DUAL CHANNEL INTERFACE PC BD 31897-001
22630-000
22630-100
P/S 30974-50 ASSY 5V DC 1 12V DC A
AC POWER PLUG 50/240 AC LINE OR SWITCHED
2832-001 CONNECTOR IEC VOLTAGE SELECT
POWER ION
RED LED
22559-000
TYPICAL PAIR 3 CHANNELS PC BD CHANNELS 1 1 6
oo : TWISTED PAIR

C-950/950R Card Cage for MT Series with Status

31229-110



ASC-903 Signal Conditioner, Complete Assembly
41511103



ASC-903 Signal Conditioner, PCB Assembly
31891-001

ASC-903 Signal Conditioner Schematic 31891-001